

REMARKS

This application has been carefully reviewed in light of the Office Action dated October 9, 2007. Claims 1 to 16 are in the application, of which Claims 1, 7, 8, 9, 10, 13 and 15 are independent. Reconsideration and further examination are respectfully requested.

Claim 1 was rejected under 35 U.S.C. § 102(e) over U.S. Publication No. 2002/0193001 (Yoshikawa). Claims 1, 13 and 15 were rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 6,169,678 (Kondo ‘678). Claims 1 and 2 were rejected under 35 U.S.C. § 102(b) over U.S. Patent No. 5,955,885 (Kurokami). Claims 1 to 5, 10 to 12, 14 and 16 were rejected under 35 U.S.C. § 102(b) over U.S. Publication No. 2002/0038667 (Kondo ‘667). Claims 7 to 9 were rejected under 35 U.S.C. § 102(e) over U.S. Publication No. 2002/0195136 (Takabayashi). Claim 6 was rejected under 35 U.S.C. § 103(a) over Kondo ‘667 in view of U.S. Patent No. 6,331,670 (Takehara). Reconsideration and withdrawal of the rejections are respectfully requested.

Claim 1

The invention of Claim 1 is directed to a solar cell module including at least one power conversion unit having a plurality of solar cell elements and a power converter. According to one aspect of the invention, the power converter is a DC-DC converter or an inverter provided in a position corresponding to a region surrounded by the plurality of solar cell elements.

By virtue of this arrangement, it is ordinarily possible to shorten the wiring distance from each solar cell element to the converter, thus reducing energy loss due to the impedance of the wiring.

The applied art is not seen to disclose or suggest the features of Claim 1, and in particular is not seen to disclose or suggest at least the feature of a power converter which is a DC-DC converter or an inverter and is provided in a position corresponding to a region surrounded by a plurality of solar cell elements.

As understood by Applicant, Yoshikawa is directed to a structure for connecting plural solar battery modules in series. Electrical connectors are attached to the ends of cables from each solar battery module and to the ends of relay cables that are joined in series to form a relay cable assembly. See Yoshikawa, Abstract.

Page 2 of the Office Action asserts that Yoshikawa (Figure 2) discloses a “power converter/terminal box (13) provided in a position corresponding to a region surrounded by all the solar cell elements.”

However, Yoshikawa’s Figure 2 simply depicts that each solar battery module includes a terminal box located on the rear body of the module. See Yoshikawa, Figure 2 and paragraph [0032]. There is not seen to be any indication that Yoshikawa’s terminal box is a DC-DC converter or an inverter, much less that such a power converter is provided in a position corresponding to a region surrounded by a plurality of solar cell elements.

Therefore, Claim 1 is believed to be allowable over Yoshikawa.

Kondo '678 is directed to a power generation apparatus having a plurality of power converters connected to a plurality of solar battery arrays. The apparatus is constructed such that the plurality of power converters do not simultaneously suspend operation when an abnormal state is detected. See Kondo '678, Abstract.

Pages 2 and 3 of the Office Action assert that Kondo '678 (Figure 1 and Column 3, lines 19 to 29) discloses a "power converter/terminal box (21) provided in a position corresponding to a region surrounded by/electrically connected to all the solar cell elements".

However, as seen by Applicant, Kondo '678's Figure 1 is simply a block diagram depicting a power converter connected to each solar battery array. At best, Kondo '678's Figure 1 indicates that the solar battery modules are separate from the power converter. There is not seen to be any disclosure of a specific positional relationship between each solar battery array and each converter, much less that a single DC-DC converter or inverter is provided in a position corresponding to a region surrounded by a plurality of solar cell elements. In this regard, Applicant respectfully submits that the phrases "surrounded by" and "electrically connected to" are not equivalent, as apparently suggested in the Office Action.

Accordingly, Claim is believed to be allowable over Kondo '678.

Kurokami is directed to measuring output characteristics of a large-scale solar cell module. The surface of the module is divided into areas each including a bypass diode. The output characteristics of the solar cell module are calculated by separately

illuminating the divided areas, then measuring and synthesizing the output characteristics of the divided areas. See Kurokami, Abstract.

Page 4 of the Office Action asserts that Kurokami (Figures 4 and 6) discloses a “power converter/power conversion unit (415, 516, 618, 718) provided in a position corresponding to a region surrounded/attached by all the solar cell elements”.

In this regard, Kurokami’s Figures 4 and 6 disclose a column of separate blocks (40, 50, 60, 70) of a large-scale solar cell module, wherein each block includes parallel blocks and a photoelectric conversion element (415, 516, 618, 718). See Kurokami, Figures 4 and 6 and Column 15, lines 20 to 45. However, Kurokami is not seen to disclose a specific relationship between a power converter and solar cell elements, much less that a power converter is surrounded by a plurality of solar cell elements.

Therefore, Claim 1 is believed to be allowable over Kurokami.

Kondo ‘667 is directed to a current detector which detects a current in the collective-power path of an AC module. The AC module integrates a solar battery and an inverter and is connected in parallel with other AC modules. If the current flowing through the current path exceeds a rated current, the current detector stops the inverter in the AC module. See Kondo ‘667, Abstract.

Page 4 of the Office Action asserts that Kondo ‘667 (Figures 1 and 2, Claim 1 and paragraphs [0033] and [0036]) discloses a power conversion unit electrically connected to a power converter of an adjacent power conversion unit.

However, Kondo ‘667 is not seen to disclose or suggest a power converter which is a DC-DC converter or an inverter and is provided in a position corresponding to a

region surrounded by a plurality of solar cell elements. In particular, as can be seen from each of Kondo '667's Figures 2, 3, 4 and 13, Kondo's conversion unit (21) includes inverter unit (3) and is positioned in a corner at the end of an AC module. Accordingly, it is not seen how Kondo's inverter unit is in a position corresponding to a region surrounded by a plurality of solar cell elements.

Thus, Claim 1 is believed to be allowable over Kondo '667.

Accordingly, the applied art is not seen to disclose or suggest at least the feature of a power converter which is a DC-DC converter or an inverter and is provided in a position corresponding to a region surrounded by a plurality of solar cell elements.

Therefore, independent Claim 1 is believed to be in condition for allowance, and such action is respectfully requested.

Claim 7

The invention of Claim 7 is directed to a solar cell module including at least one power conversion unit having a plurality of solar cell elements arranged on a plane and a power converter which is a DC-DC converter or an inverter. According to one aspect of the invention, the power converter is arranged in a position of minimizing a sum of all collecting losses when collecting a power generated by the solar cell elements to the power converter.

The applied art is not seen to disclose or suggest the features of Claim 7, and in particular is not seen to disclose or suggest at least the feature of a power converter arranged in a position of minimizing a sum of all collecting losses when collecting a power generated by a plurality of solar cell elements to the power converter.

Takabayashi is directed to a plurality of solar cells interconnected in series or parallel with one positive terminal and one negative terminal. At least part of an electric line is not insulated, and instead is grounded at an electrical middle point between the positive and negative terminals. See Takabayashi, Abstract.

Page 7 of the Office Action asserts that Takabayashi (Figures 11 and 13) discloses a power converter/conditioner corresponding to a power converter. The Office Action further asserts that Takabayashi's power conditioner 1303 minimizes a sum of all collecting losses by being the closest to the position of the solar cell array when collecting power generated by the solar cell elements.

However, even accepting for purposes of argument that Takabayashi's power conditioner 1303 corresponds to a power converter, which is not conceded, Takabayashi's Figure 13 is a block diagram, and is not seen to indicate any physical positional relationship between the power conditioner and the solar cell array. In fact, Takabayashi appears to suggest that its power conditioner is connected to a single output of the entire solar cell array, and thus is far apart from each solar cell element, rather than in a position of minimizing a sum of all collecting losses. See Takabayashi, paragraph [0049].

Moreover, Takabayashi's power conditioner is not even shown in Figure 11. Accordingly, it is not seen how Takabayashi's Figure 11 indicates a position of the power conditioner at all, much less that Takabayashi indicates a power converter arranged in a position of minimizing a sum of all collecting losses when collecting a power generated by a plurality of solar cell elements to the power converter.

Therefore, independent Claim 7 is believed to be in condition for allowance, and such action is respectfully requested.

Claims 8 and 9

Independent Claim 8 is directed to a solar cell module including at least one power conversion unit having a plurality of solar cell elements arranged on a plane and a power converter which is a DC-DC converter or an inverter. The solar cell elements each respectively have a terminal member, and the power converter is arranged in the closest position between the terminal members in a state of arranging the solar cell elements.

Independent Claim 9 is directed to a solar cell module comprising at least one power conversion unit having a plurality of solar cell elements arranged on a plane and a power converter which is a DC-DC converter or an inverter. The solar cell elements each respectively have a terminal member, and the power converter is arranged in the closest position between the terminal members in a state of arranging the solar cell elements, and in a position of minimizing a sum of all collecting losses when collecting the power generated by the solar cell elements.

The applied art is not seen to disclose or suggest the features of Claims 8 and 9, and in particular is not seen to disclose or suggest at least the feature of providing each solar cell element with a terminal member.

Page 7 of the Office Action asserts that Takabayashi (Figures 11 to 13) discloses a plurality of solar cell elements (1101), each respectively having a terminal member (1104 and 1105).

However, as can be seen from Takabayashi's Figures 9 and 11, Takabayashi's solar cell elements are arranged together in strings, with a terminal (e.g., 1104 or 1105) placed only at the end of certain strings. Accordingly, it is not seen how Takabayashi discloses or suggests providing each solar cell element with a terminal member.

Moreover, and with particular regard to Claim 9, Takabayashi is not seen to disclose or suggest a power converter arranged in a position of minimizing a sum of all collecting losses, as discussed above with regard to Claim 7.

Therefore, independent Claims 8 and 9 are believed to be in condition for allowance, and such action is respectfully requested.

Claim 10

Independent Claim 10 is directed to a solar cell module comprising at least one power conversion unit having two adjacent solar cell elements and a power converter which is a DC-DC converter or an inverter provided in a position corresponding to a region on the extension of a gap between the two adjacent solar cell elements.

The applied art is not seen to disclose or suggest the features of Claim 10, and in particular is not seen to disclose or suggest at least the feature of a power converter which is DC-DC converter or an inverter provided in a position corresponding to a region on the extension of a gap between two adjacent solar cell elements.

Page 5 of the Office Action asserts that Kondo '667 (Figures 2 and 4 and paragraph [0084]) discloses a power converter/inverter (21) provided in a position on the extension of a gap between two adjacent solar cell modules.

However, as discussed above with respect to Claim 1, Kondo ‘667’s Figures 2, 4 and 13 show Kondo’s conversion unit (21) and inverter (3) positioned at a corner at the end of each AC module. Accordingly, it is not seen how Kondo’667 discloses a power converter which is DC-DC converter or an inverter provided in a position corresponding to a region on the extension of a gap between two adjacent solar cell elements.

Accordingly, Claim 10 is believed to be in condition for allowance, and such action is respectfully requested.

Claim 13

Independent Claim 13 is directed to a solar cell module comprising at least one power generation unit having a plurality of solar cell elements and a terminal box provided in a position corresponding to a region surrounded by all the solar cell elements to collect outputs of the solar cell elements.

The applied art is not seen to disclose the features of Claim 13, and in particular is not seen to disclose or suggest at least the feature of a terminal box provided in a position corresponding to a region surrounded by all of a plurality of solar cell elements.

In this regard, pages 2 and 3 of the Office Action assert that Kondo ‘678 (Figure 1 and Column 3, lines 3 to 29) discloses a terminal box (21) provided in a position corresponding to a region surrounded by the plurality of solar cell elements.

However, as discussed above, Kondo ‘678’s Figure 1 is simply a block diagram of a power converter connected to each solar battery array. There is not seen to be any disclosure of a specific positional relationship between each power converter (21) and

the solar battery array, much less disclosure of a terminal box in a position corresponding to a region surrounded by all of a plurality of solar cell elements.

Therefore, independent Claim 13 is believed to be in condition for allowance, and such action is respectfully requested.

Claim 15

Independent Claim 15 is directed to a solar cell module comprising at least one power generation unit having two adjacent solar cell elements and a terminal box provided in a position corresponding to a region on extension of a gap between the two adjacent solar cell elements to collect outputs of the two adjacent solar cell elements.

The applied art is not seen to disclose or suggest the features of Claim 15, and in particular is not seen to disclose or suggest at least the feature of a terminal box provided in a position corresponding to a region on extension of a gap between the two adjacent solar cell elements.

Page 3 of the Office Action asserts that Kondo '678 (Figure 1 and Column 3, lines 3 to 29) discloses a terminal box/power generation unit (21) placed in a region next to the solar battery module/array, wherein there is a gap between the two adjacent solar cell elements/arrays to collect outputs of the two adjacent solar cell elements.

However, as discussed in detail above, Kondo '678's Figure 1 is seen to simply depict a block diagram of a power converter connected to each solar battery array, and there not seen to be any disclosure of a specific positional relationship between power generation unit (21) and the solar battery array.

Therefore, independent Claim 15 is believed to be in condition for allowance, and such action is respectfully requested.

The other claims in the application are each dependent from the independent claims discussed above, and are believed to be allowable over the applied references for at least the same reasons. Because each dependent claim is deemed to define an additional aspect of the invention, however, the individual consideration of each on its own merits is respectfully requested.

No other matters being raised, it is believed that the entire application is fully in condition for allowance, and such action is courteously solicited.

Applicant's undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

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